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ABSTRACT

This final report describes a 3-1/2 year project to establish model technology assessment procedures and to train early intervention personnel and families of young children with moderate to severe disabilities to function as effective members of a core assistive technology assessment team. The project's outreach goals focused on stimulating services via dissemination, training and replication, assisting states, providing state-of-the-art product development, and serving as a national technology assessment resource. Training materials developed included written and multimedia materials, procedures for assessing appropriate applications for specific children, examples of follow-up activities, case studies of children, and suggestions for problem solving. Evaluation found the program effective in four areas: (1) appropriateness of the process and recommendations for this population; (2) positive outcomes for children and families; (3) child progress reported by families; and (4) child progress reported by teachers. Overall, the project's replication and continuation sites directly affected 697 children and their families, and over 1,241 people attended project presentations at conferences. Individual sections of this report describe the project's goals and objectives, its theoretical and conceptual framework, its major features, problems and solutions, evaluation, and impact. (DB)

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ED 420 138

Technology Team Assessment Process (Project TTAP)

A Final Report for the Project Period October 1, 1994 - February 28, 1998

United States Department of Education
Office of Special Education Programs
Early Education Program for Children with Disabilities
Project Number HO24D40023

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Project TTAP: Technology Team Assessment Process

II. Abstract

TTAP Outreach, funded by the U.S. Department of Education's Early Education Program for Children with Disabilities (EEPCD), was based on an earlier EEPCD model demonstration project. The major purposes of TTAP, which began October 1, 1994, and ended February 28, 1998, Outreach were to establish model technology[1] assessment procedures in replication sites and to train early intervention personnel and families to function as effective members of a core assistive technology assessment team. An appropriate technology assessment based on a team approach which closely involves families as full partners and which determines effective technology applications for youngsters from birth through 8 with moderate to severe disabilities, helps fulfill the promise technology has for young children with disabilities.

TTAP's major outreach goals focused on stimulating services via dissemination, training and replication, assisting states, providing state-of-the-art product development, and serving as a national technology assessment resource. Product development, revision, and dissemination; awareness activities; replication training and consultation; and local, regional, and national cooperative activities were among the Project's objectives. The target audience included the range of disciplines required by IDEA in schools, public and private agencies, state level personnel, families, and other stakeholders involved in early intervention services.

TTAP Outreach staff trained core technology assessment teams whose personnel roles included an early childhood specialist, a technology specialist, an occupational therapist or physical therapist, a communication specialist, and a family member. The teams served either as members of a comprehensive assessment team or as an assisting technology assessment team. Sites sent trainees to Macomb for 3 or more days of intensive training, or TTAP staff traveled to the site. Trainee outcomes were measured according to TTAP competencies. Follow-up consultation and training were conducted, together with a site visit by TTAP staff. All sites collected data on

[1] The term is used interchangeably with "computers" and "assistive technology" to refer to devices and applications which increase, maintain, or improve the functional capabilities of children with disabilities.

assessment recommendations and outcomes related to children, families, and early intervention personnel.

Training materials, based on a series of modules, included written and multimedia materials. Procedures for making recommendations for appropriate applications for specific children were included, along with examples of follow-up activities, case studies of children, and suggestions for solving problems that arise when youngsters use technology. Videotapes of case studies of children, actual assessment situations, and follow-up observations were used during training.

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IV. Goals and Objectives of TTAP

TTAP (Technology Team Assessment Process) Outreach had three major goals: (1) Stimulate development of technology assessment teams to ensure that children from birth to 8 with moderate to severe disabilities and their families receive a thorough and knowledgeable team assessment and follow-up services; (2) Train early intervention personnel and family members so they can function as effective members of a TTAP assessment team; and (3) Serve as a national resource and information exchange for technology assessments. Six Project objectives included awareness activities; replication; product development, revision, and dissemination; training; consultation; serving as a resource for states; and cooperation with local, regional and national agencies.

V. Theoretical or Conceptual Framework

"They (the technology assessment team) allowed her to tap into her own abilities and also opened Bob's and my eyes to our child's capabilities, not her disabilities."

A mother's comments following her daughter's technology assessment testify to the value of assessing children's abilities to determine appropriate assistive technology.

Contemporary assistive technology applications give young children with moderate to severe disabilities a set of tools to access people, objects, and events in the environment in ways that were not possible 15 years ago. Moreover, assistive technology provides families and professionals ways to encourage children themselves to act, in effect to 'head learned helplessness off at the pass' as children grow older. Unquestionably, today's more powerful and relatively inexpensive computers, used with alternative input and output devices and interactive multimedia software, offer people with disabilities the means to do things they have not been able to do before this period in history. In many instances, computer technology assists children with moderate to severe disabilities to function in a variety of early childhood settings. The positive impact of technology on the lives of individuals with disabilities and their families and communities was recognized in the 1988 passage and 1994 reauthorization of the Technology Related Assistance to Individuals

with Disabilities Act (the Tech Act) and the Individuals with Disabilities Education Act (IDEA) Amendments of 1997.

However, without *an appropriate team-based assessment,* determining what technology applications a child could best use is like traveling in the American West without a road map. Before effective applications and Individual Educational Plans (IEPs) or Individual Family Service Plans (IFSPs) can be determined for individual youngsters, a team-based technology assessment, using appropriate hardware and software, must be carried out.

Focusing on the basic importance of technology assessment to determine appropriate applications to meet the educational needs of individual young children, TTAP is designed to assist in meeting the National Education Goal that states "*all* children in America will enter school ready to learn." Without appropriate assessment, children with moderate to severe disabilities will neither receive appropriate assistive technology nor have opportunities to control events and learn via technology early in their lives. Without early expectations for control and learning, many children with moderate to severe disabilities will be unable to achieve success as learners or, as adults, to exercise the rights and responsibilities of citizenship, another National Goal. If families, caregivers, and professional staff do not know about the importance of a comprehensive technology assessment process or have skills related to computers, software, and adaptive devices, the future may be bleak for children who need specific, often relatively inexpensive technology applications. The TTAP process is designed to prescribe the right technology for the right child at the right time.

The problem of technology assessment has several facets. First, comprehensive, validated *early childhood* technology assessment procedures are scarce, even when professionals and families understand the need for them (Hutinger, 1996). While a small number of available technology assessment processes offer checklists, profiles, and forms, many do not focus on procedures to follow before, during, and after an assessment. Rarely do they specifically address the unique developmental needs of a particular child and family. Rarely are the assessments done by a *team* involving the child, parents, teachers, and professionals. Team-based assessments,

while important to the success of recommendations for technology assessment, are not as prevalent as they should be for reasons ranging from lack of resources to lack of knowledge to lack of time. Neither is follow-up to assessment an established component. As children move from program to program or from school to school, follow-up assessments are minimal (Hutinger, Johanson, & Stoneburner, 1996). TTAP Outreach provides needed resources so knowledge will be sufficiently widespread. Concerned families, staff, and key decision makers are likely to realize the importance of providing the time to make proper assessments and recommendations for children for whom technology is basic.

We sometimes hear a technology-naive teacher, when talking about children with disabilities, say "*These children don't need computers, they need the basics.*" However, for many children with disabilities, technology applications *are* the basics. Computers are nice additions to the curriculum for some children, but for many children with disabilities, computer applications are more than that, *they are essential*. Technology can serve as an equalizer for a child with disabilities in many situations so that s/he can function in a variety of settings and participate in similar activities that typical young children do, including playing games, drawing, and making music. Technology can assist in all these activities, but without assessment, the appropriate equipment, adaptations, and activities for an individual child may never be found.

Compounding the problem of technology assessment, in the real world it is not uncommon for a single professional to assess a young child's needs, with little or no family input (Hutinger, 1996). Sometimes early childhood staff members are unfamiliar with the hardware or the applications, so the task of assessing falls to the person who understands computers but not young children. Concerning assessment models, partial assessment features, such as strategies to assess for switch use or for augmentative communication, are in place in some agencies. However, the bulk of assessment reports in the literature are related to children who are older than eight, adolescents, and adults.

Technology and rehabilitation experts, adept at figuring out environmental adaptations and assessing adolescent and adult needs, are at a loss when it comes to determining developmentally

appropriate learning activities for young children, although they know how to set up systems, use adaptive input and output, and understand how software operates. Some persons charged with the assessment task sincerely believe that four year olds cannot benefit from technology. They have not seen our videotapes, studied our data, or attended our training sessions.

Early childhood technology assessments conducted by teams are the exception rather than the rule. Yet it takes the combined expertise of a team, including families, to determine proper positioning and appropriate input method, to select developmentally appropriate software, and to make recommendations for future learning activities. A team approach for assessment is important(Arkansas AT Fact Sheet, 1996; Parette, Hourcade, & VanBiervliet, 1993; South Carolina AT Fact Sheet, 1996) as is family involvement on the team (Hutinger, 1996; Parette & Brotherson, 1996).

In summary, although people see a need for technology assessment, useful materials and procedures related to technology assessment are scarce. While assessment for technology applications serves as part of a comprehensive assessment, less than a handful of early intervention models and literature sources suggest procedures for finding out whether a child and family could and would make effective use of a technology application.

VI. Description of the Project

The TTAP Model

A graphic depiction of the TTAP system is shown in Figure 1, while an overview of our assessment procedures can be seen in Figure 2. Based on the assumption that developmentally appropriate technology intervention that integrates social, emotional, cognitive, communication, and physical goals promotes enhanced positive functioning in children with disabilities, TTAP was developed in a 3-year period (1989 - 1992) as an Early Education Program for Children with Disabilities (EEPCD) model service delivery project. TTAP formalized and expanded the technology assessment procedures Macomb Projects began when we started developing technology applications. We recognized early that an appropriate technology assessment using a *team* approach involving

families as full partners determined effective technology applications for individual children and avoided the potential for technology recommendations being "hit or miss" propositions.

Figure 1. The TTAP Model System

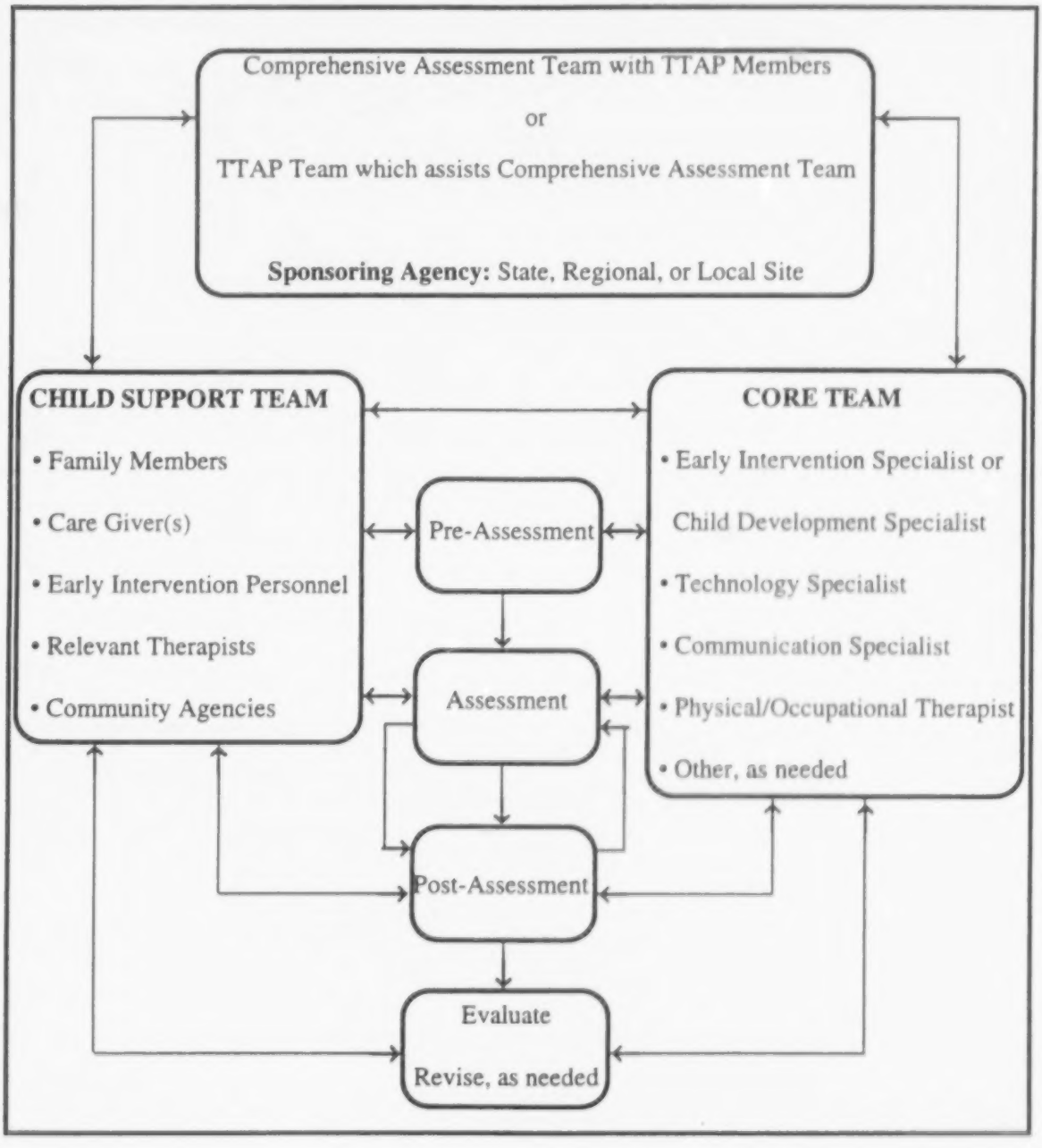
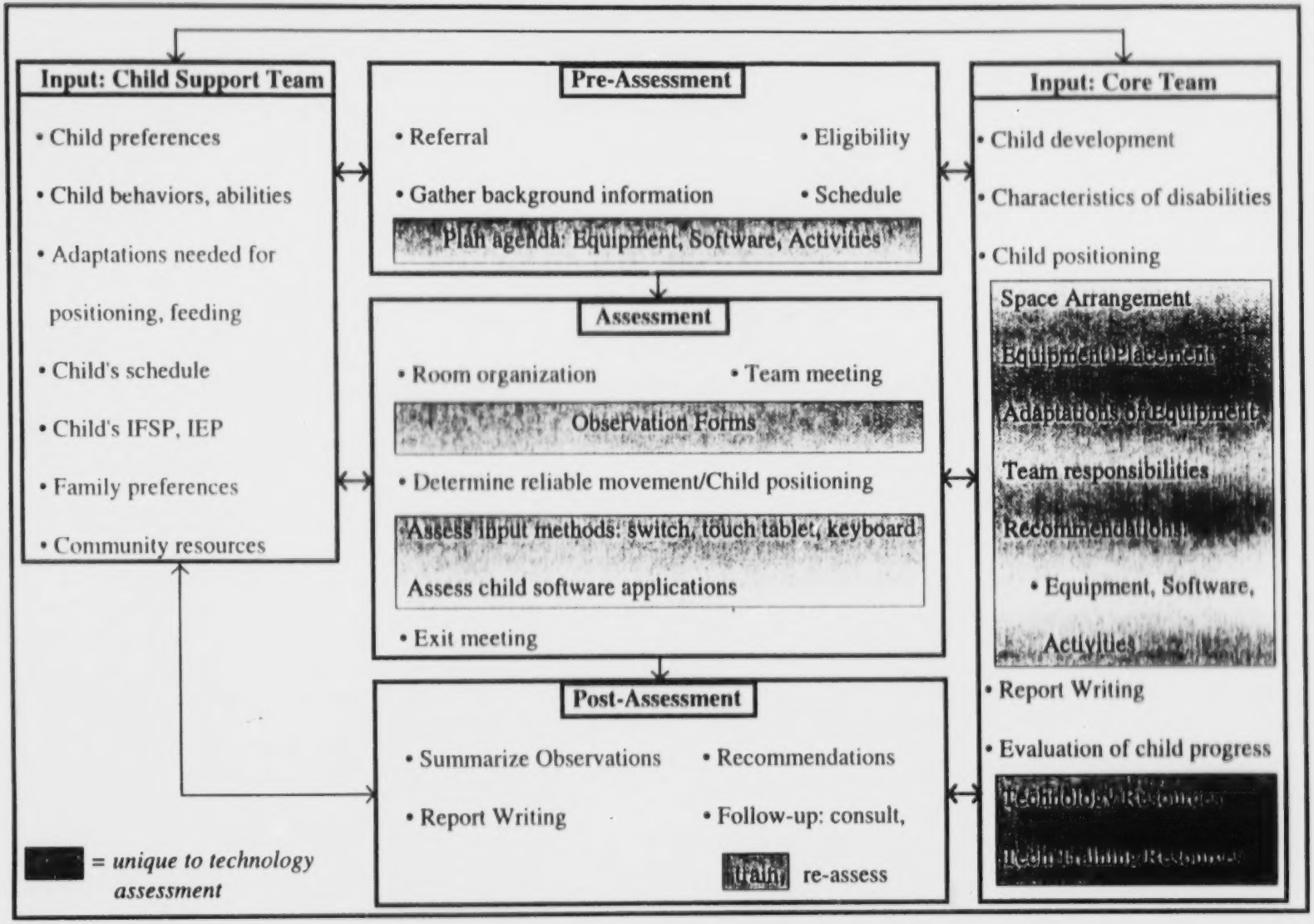


Figure 2. TTAP Model Procedures and Comprehensive Assessment Process



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The TTAP model defines two teams to be involved in the assessment: the Core Team and the Support Team. The Core Team is either a stand alone team or part of a comprehensive assessment team. The roles of Core Team participants include an early intervention specialist, a technology specialist, a physical therapist or occupational therapist, and a communications therapist on each site's training team. One person may serve two roles. Parents and professionals from other disciplines defined by the law are also involved on the Core Team, depending on site characteristics and resources. The Support Team consists of family members and any staff who currently work with the child.

TTAP is a dynamic team-based, comprehensive assessment process which serves a preliminary and follow-along function necessary to incorporate intervention with technology. It is not a static model since some content must adjust as the marketplace introduces new technology that accomplishes new and/or different functions with greater ease and, often, with less expense. TTAP has three distinct phases with specific activities occurring (1) before the assessment, (2) during the assessment or the day(s) of the assessment, and (3) after the assessment. Core Team members interview family members and staff, review written background information, child therapy reports, IFSP/IEPs, and videotapes to plan the activities and materials to be used with the child. Assessments are conducted using computers, compatible adaptive peripherals, and commercially-available early childhood software. During the assessment, team members make decisions on reliable movement, child positioning, suitable input method(s), software applications, and appropriate equipment placement. Recommendations on all of these factors are needed to ensure effective use of technology to help the child meet IFSP/IEP goals and to integrate the applications into the child's daily life. The team approach, which includes the Support Team, ensures integration into other assessment and curricular considerations and into IFSP/IEP development.

Replication and Continuation Sites

From October 1994 to February 1998, replication training was provided to 84 professionals in 18 sites from 6 states (Illinois, Kentucky, Minnesota, Missouri, Nebraska, and Wisconsin). Sites

with one or two assessment teams sent all team members to training. One or two team members from larger sites were trained as trainers who then trained the remainder of the staff at the site.

Table 1 provides information about each TTAP site. Four of the sites are special education cooperatives which serve large numbers of children and provide assessments as part of their services. One site in Urbana, Illinois, is an assessment clinic, serving 7500 preschool age children

Table 1. TTAP Outreach Sites According to Levels of Involvement as of February 1998

	Sites According to Levels of Involvement	# Children	# Staff
STATE	**LEVEL II Sites (16)**		
Illinois	Carle Clinic Association/Department of Pediatrics - Urbana	7500	34
Illinois	Clearbrook Center Compuplay - Rolling Meadows	31	5
Illinois	Kaskaskia Special Education District #801 - Centralia	2300	400
Illinois	West Central Illinois Special Education Cooperative - Macomb	913	4
Kentucky	Bluegrass Technology Center - Lexington	112	7
Kentucky	Enabling Technologies - Louisville	425	6
Kentucky	Special LINK - Covington	0 *	1
Kentucky	Western Kentucky Assistive Technology - Murray	0 *	5
Minnesota	Anoka-Hennepin Birth to Three Program - Anoka	175	26
Missouri	Knox County R-1 School District - Edina	100	7
Nebraska	Educational Service Unit #1 - Wakefield	193	4
Nebraska	Educational Service Unit #10 - Kearney	45	3
Nebraska	Educational Service Unit #3 - Omaha	147	6
Nebraska	Lincoln Public Schools - Lincoln	66	3
Nebraska	North Platte Public Schools - North Platte	97	3
Wisconsin	Cooperative Educational Service Agency 2 - Salem	629	72
	Level II Site Total	**12,733**	**586**
STATE	**LEVEL III Sites (2)**		
Illinois	Crystal Lake Elementary School, District #47 - Crystal Lake	65	23
Illinois	Sangamon Area Special Education District - Springfield	700	20
	Level III Site Total	**765**	**43**
STATE	**CONTINUATION Sites (2)**		
New York	Just Kids Early Childhood Learning Center - Middle Island	400	333
Tennessee	Signal Centers - Chattanooga	43	2
	Continuation Sites Total	**443**	**335**
	Total Number of Children Served/Number of Staff	**13,941**	**964**
	Total Number of Sites	**20**	

** These represent agencies that serve a large number of children. The number of preschool children served varies.*

*** State commitment.*

No Level IV Sites have been designated. Level III Sites are training new staff members on the TTAP model but have not trained personnel from other sites.

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each year, 5% of whom receive technology assessments. The four sites in Kentucky are regional assistive technology centers which provide technology assessments on a regular basis. They incorporated the TTAP model into their assessments for young children. Three of the four Nebraska sites are Educational Service Units which provide educational and assessment services to large regions of the state. The other sites include a Compuplay Center, a Birth to Three Program, large school districts, and individual schools. All sites report that an average of 5% of the children they serve receive TTAP assessments.

Replication sites were classified according to their level of existing technology assessment experience and skill (see Table 1). TTAP Competencies were used to determine entry and exit levels for sites. Sites were placed within one of four site levels.

Level I sites' team members were new to technology but had experience in assessment procedures with young children. They received initial training on TTAP then systematically began to integrate technology assessments into their existing assessment procedures. When needed, TTAP Outreach staff provided additional training and follow-up until site staff and outreach staff agreed that adequate skills had acquired by site staff to begin Level II training. All Level I sites moved to Level II.

Level II sites' team members were technology users who had experience in assessment procedures with young children. Staff acquired or demonstrated basic technology assessment skills. These sites received initial training on the TTAP process, then began implementation of the model and data collection. TTAP staff provided follow-up to assist site staff in gaining needed competencies for full implementation of the model. At the end of the 3 year outreach period, 16 of the 18 sites operated as Level II sites. They conduct TTAP assessments regularly; however, they need more experience before they move to the next level.

Level III sites fully implement the TTAP model and can serve as demonstration sites. The sites keep child and family data based on their assessment recommendations. TTAP Outreach staff provided assistance in data collection and analysis procedures. Additionally, Outreach staff provided follow-up support on model training and assisted site staff in determining if the agency

requires specific specialized training so that goals and objectives could be attained. Two TTAP sites, Crystal Lake School District #47 in Crystal Lake, Illinois, and Sangamon Area Special Education District in Springfield, Illinois, qualified as Level III sites.

The Level IV designation is for sites that have achieved sufficient expertise in the model to offer training to others outside their own agencies. Level IV sites have the option to be groomed to serve as resources on technology assessment for early intervention professionals in their region or state. Neither of the Level III sites has moved into Level IV status. They do train new staff at their own sites but do not provide training to others.

Two model continuation sites, Signal Centers in Chattanooga, Tennessee, and Just Kids Early Learning Center in Middle Island, New York, were operational.

Training Activities

Replication training was conducted in Macomb or on-site over a 3- to 5-day period depending on the experience and competency level of the team members. Training sessions were scheduled at regular intervals, at least three times each year at the Macomb site. Although training was available for 5 consecutive days, most sites participated in the 3-day sessions since they demonstrated Level II or above technology competencies. Five days of training were recommended for site personnel who were novices in computer and adaptive equipment use. The first 2 days of training were spent learning about computer operations, software, and alternate input methods, while the last 3 days focused on TTAP's assessment process. A technology assessment for a young child with disabilities, served either locally or by the site, was conducted by the participants on the last day of training. A sample agenda from the 3-day training session is contained in Figure 3.

Twelve 3-day training sessions were conducted between November 1994 and December 1997. Nine of the sessions took place in Macomb with teams from two or more sites participating. Three of the 3-day sessions were conducted at the replication sites, due to the large number of teams involved or the site's proximity to Macomb. In November 1995, TTAP staff trained 5 team members from the Sangamon Area Special Education District in Springfield, Illinois. In April 1997, the technology coordinator for the Birth to Three Program in Anoka, Minnesota, requested

Figure 3. TTAP Training Agenda

Day 1

Benefits of Technology Assessment and Team Approach

Purpose of Technology Assessment

Overview of Technology Assessment Process

Designing the Environment

Off-Computer Activities

Selection of Input Method

Curriculum Applications

- Switch
- TouchWindow
- Discover:Kenx and Key Largo
- IntelliKeys

Curriculum Integration

Day 2

Overview of TTAP Procedures

Planning Selected Child's Assessment

- Before the Assessment Procedures
  - Review Background Information Form and videotape
  - Discuss IEP goals & Evaluation Reports
  - Planning the Assessment Agenda
- During the Assessment Procedures
  - Assessing Reliable Movement, Positioning, Equipment Placement
  - Designing Off-computer Activities, Computer Activities
  - Customizing Activities for Selected Child - creating Ke:nx set-ups

Preparing for the Assessment

- Setting Up the Environment
- Assessment Agenda

Day 3

Meet with Team Members - set up equipment and video camera

Conduct Assessment

After the Assessment Procedures

- Discuss evaluation process
- Review videotape
- Complete Individual Trial Form and TECH ACCESS as group
- Discuss recommendations
- Write report on computer
- Discuss follow-up procedures for child and family

Resources

Summary

Workshop Evaluations

TTAP training for 14 early intervention personnel in her area. Training was conducted on-site over a 3-day period. An assessment of a 2-year-old boy took place on the last day.

In November 1997, TTAP was contacted by a technology coordinator in Nebraska who requested training for five teams from various parts of the state. Training was conducted in Omaha for 19 early childhood professionals from Lincoln, North Platte, Wakefield, Kearney, and Omaha. Team members planned and participated in the assessment of a 4-year-old child with multiple disabilities on the last day of training. Training was requested for other Nebraska teams and was scheduled for July 1998.

Follow-up contact with sites continued via phone, fax, mail, or e-mail on a regular basis throughout the Outreach period. Based on each site's needs, requests, time, and budget, follow-up training was provided.

Workshops

In August 1994, before the start of our Outreach Project, training was conducted for 15 occupational therapy students at Colorado State University in Fort Collins, Colorado. The training was funded through a personnel preparation grant acquired by that university. Training centered around TTAP's assessment procedures and resulted in a team assessment with an area child on the third day of training. The assessment and team meetings were professionally videotaped for a training product to be used in future courses at the university. Although the occupational therapy department as a whole cannot be considered a replication site, many of the students have been serving on assessment teams for technology. We have received positive feedback from several of them as they begin to incorporate TTAP procedures into their work.

In April 1995, Region VII Education Service Center in Kilgore, Texas, requested a two-day workshop on technology assessment. Training was conducted for 30 early childhood teachers, therapists, and families who serve on assessment teams for their region. In December 1996, another Texas Education Service Center, Region XIV in Abilene, invited TTAP staff to conduct a 1-day workshop on technology assessment for participants of a regional technology conference.

State technology projects in Iowa, Nebraska, Minnesota, and South Dakota held a second regional conference in 1995 and invited TTAP staff to present information about TTAP procedures[2]. The Illinois Speech-Language-Hearing Association requested a 3-hour workshop on technology assessment for their 37th Annual Convention held in Arlington Heights, Illinois, in February 1997. The session was well received by the 24 participants. A TTAP workshop was conducted in March 1997 for an assessment team from the Cabell County Schools in Huntington, West Virginia. The regional team members were just beginning to establish their assessment process and requested a workshop on the TTAP model. They have used the TTAP forms during assessments and have requested further training which may be scheduled in the near future depending on the site's financial resources.

In Illinois, TTAP staff provided eight workshops and presentations to teachers, support personnel and families. In October 1994, staff presented a case study of a TTAP assessment at the Illinois Education and Technology Conference. A 1-day workshop on technology assessment was requested in February 1995 for 30 participants from various schools in the Urbana, Illinois, area. Participants sought training on assessing the technology needs of their children with severe disabilities. TTAP procedures were shared with participants of ACTT's (Activating Children Through Technology) annual technology conference in 1994, 1995, and 1996. At the 1996 conference, four parents participated in a panel discussion. The parents had been involved in their children's TTAP assessments and shared their experiences and perceptions with conference participants. Sessions were also provided by TTAP staff at the 1997 and 1998 Early Childhood Technology Conference sponsored by STARNET, Illinois' technical assistance organization for early childhood personnel. The sessions on technology assessment have been consistently well-attended and evaluated positively throughout the funding period.

Assessments

Technology assessments were conducted as part of TTAP training and upon request from families or school staff. Children assessed through the TTAP model range in age from fifteen

[2]TTAP staff presented at the first regional conference in 1992 during TTAP model development.

months to 8 years, and exhibit a variety of abilities with moderate to severe disabilities. The majority of the children had multiple disabilities similar to a case study child, Jenna, who had cerebral palsy, poor head control, limited movement of her hands and arms and no means of physical or verbal communication.

TTAP Outreach staff have conducted 22 assessments since 1994. Twelve took place during training. Each training team helped plan and conduct the assessment. The other ten assessments were conducted by TTAP staff with the participation of the child's Support Team. One team from a local agency, the West Central Illinois Special Education Cooperative, participated in several assessments in Macomb over the past year as a part of ongoing training. The team is gaining competencies with each session and plans to conduct assessments independently as a TTAP site.

Dissemination Activities

Information about TTAP was disseminated through a variety of media. A brochure on training and other Outreach services was disseminated to persons requesting information through the mail or by phone, as well as those attending presentations given by staff members. It was also included in a special mailing to families who participated in technology assessments to inform them of our training topics which may be applicable to their child's support team. Multiple copies of the TTAP brochure were mailed to various professional and family organizations.

During the funding period, TTAP Outreach staff distributed awareness materials during 29 presentations at 17 national, regional, and local conferences. Highlights of national, state and regional activities include invited presentations from state technology projects in Iowa, Nebraska, Minnesota, and South Dakota, an invited workshop for the Illinois Speech-Language-Hearing Association's convention, presentations at the Closing the Gap Conference in Minnesota, CEC's divisional Technology and Media (TAM) Conference, and ACTT's (Activating Children Through Technology) annual conference in Macomb. All sessions pertained to some aspect of TTAP's assessment process. The CEC Conference Committee invited TTAP staff to present a session on technology assessment as part of the 1996 conference's early childhood technology strand.

Awareness information in the form of Project brochures and/or handouts about TTAP training dates and topics was sent to conferences in Ohio, Wisconsin, and Minnesota; the Family Resource Center on Disabilities in Chicago, Illinois (upon their request); and to the state assistive technology projects in Illinois, Iowa, Florida, Kentucky, Nebraska, and South Carolina. The president of the National Cristina Foundation also requested awareness information to share with interested persons across the country.

Since 1994, four articles about TTAP appeared in Macomb Projects' quarterly publication, *ACTTive Technology*. The Illinois Assistive Technology Project asked permission to reprint one of the articles in the Summer 1996 issue of their newsletter, *TECHTalk*, which is distributed throughout Illinois. Information on benefits of technology assessment for young children and their families, obtained through an interview of TTAP staff, appeared in a 1994 issue of the *Zero to Three* newsletter. The editor for *Counterpoint,* a publication distributed to state special education directors, requested an article about the TTAP model and its cost-effective approach to technology assessment. The article will appear in a 1998 issue.

TTAP's procedures and forms are available in a manual titled *Technology Team Assessment Process*. This publication, available from Macomb Projects, can be used by sites as a training tool for new team members or by individuals who want to learn about the assessment process. Materials and forms from the TTAP manual, including the *Individual Trial Form* and *TECH ACCESS,* were included in training materials provided to early childhood personnel throughout Iowa in 1994. Permission was requested to copy the materials for distribution to trainees from various Area Education Agencies. In 1994, the Indiana technology project requested permission to use parts of the TTAP manual in one of their publications. In 1996, a professor at George Mason University in Fairfax, Virginia, asked permission to use the TTAP manual as a required text for a special education technology course. Also in 1996, a regional technology trainer in Wisconsin requested permission to copy a few of the TTAP forms to include in her training manual for assessment teams in her area.

Project information has been posted on Macomb Projects' World Wide Web site (www.mprojects.wiu.edu), the NCIP (National Center for Improved Practices) board, and the NEC*TAS site, which contains information on early childhood projects. Information on TTAP appears in several national databases maintained by organizations, such as NICHCY, TRACE, and Closing the Gap, as well as regional databases, including Idaho's Careline and Illinois' STARNET Region II Assistive Technology Information/Research Packet. TTAP staff present information on technology assessment to graduate and undergraduate students in the Early Childhood Assessment course at Western Illinois University.

In December 1995, TTAP was featured on "Developmental Goals Through Technology," a broadcast of APPLES Magazine, an interactive satellite program sponsored by STARNET, an Illinois State Board of Education funded project which provides technical assistance to early intervention personnel and families in Illinois. A videotape of the show is available.

Information about TTAP products is available from Macomb Projects, 27 Horrabin Hall, Western Illinois University, Macomb, Illinois 61455; 309/298-1634; fax 309/298-2305; www.mprojects.wiu.edu.

VII. Problems and Solutions

Three deviations were made from the Project's original objectives. These were addressed in the March 1996 annual performance report. One was the replacement of the diagnostic clinics with individual assessment sessions. The diagnostic clinics were not feasible due to space, staff, and scheduling constraints. Conducting assessments on an individual basis as part of Outreach training has proven successful.

The second and third deviations concern TTAP product development. Staff originally planned on developing an interactive software program, *Something's Fishy*, to be used during assessments. It was realized after the project started that adequate time and resources were not available for this task. Macomb Projects sought and was able to secure other funding for this activity. The other task change was the production of the case study videotape. The original plan was to put the case study on videodisc. However since VCR's are still more accessible than

videodisc players to most people, it was decided that the case study would be available in videotape format. Other than these three changes in the objectives, no other methodological or logistical problems were experienced. We can attribute this to our staff's experience in providing replication training and services through an earlier outreach project.

VIII. Evaluation Findings

Data related to the TTAP process, children, families and staff were collected using several sources and methods. Data included assessment reports, assessment planning forms, copies of the *TECH ACCESS* and *Individual Trial Forms* recorded during assessments, follow-up questionnaires from families and school staff, site staff satisfaction questionnaires and phone interviews with site staff and families. Data support TTAP's effectiveness in four areas: (1) the TTAP process and recommendations are appropriate for young children with moderate to severe disabilities: (2) the results of a TTAP assessment, with accompanying recommendations, show positive outcomes for children and families; (3) families report child progress; and (4) teachers report child progress.

Positive Outcomes for Children and Families

According to a modified longitudinal research study mounted by Macomb Projects which followed 7 children assessed by TTAP into school settings (Hutinger, Johanson, & Stoneburner, 1996) the results of a TTAP assessment, with accompanying recommendations, show positive outcomes for children and families when equipment is available and when parents and staff are trained to use technology with children. Survey results from an annual Family Follow-up Survey distributed to families who have participated in TTAP assessments support the research findings and indicate that families and children have benefited in many ways from the process.

Data from the most recent family survey, completed in 1997, indicate that 94% of the 63 families who responded indicated that their child now uses technology. Before the assessment, only 33% of the children used a computer or other technology. Most families (87%) report that technology is now written into their child's IFSP or IEP. Families at replication sites make many favorable comments about their child's progress with technology at home and school.

However, when program staff were surveyed, their perceptions differed from those of family members. Follow-up records on 25 children assessed by TTAP replication sites show that when resources are available, only 13 of the children (52%) who received TTAP assessments went on to engage in the applications recommended as a result of the assessment. The discrepancies between program staff and parent perceptions of technology use were not surprising. Similar discrepancies were also found in the qualitative study, Effective Use of Technology to Meet Educational Goals of Children with Disabilities (Hutinger, Johanson, & Stoneburner, 1996), mounted by Macomb Projects.

The TTAP assessment process itself was viewed favorably. For example, one parent commented, *"I was very impressed with the assessment - it was one of the first times I saw my daughter's strengths first (instead of weaknesses)."*

Another parent from the Just Kids continuation site made favorable comments on her involvement in the TTAP assessment of her daughter's abilities and multiple disabilities. *"I was very involved in the TTAP process. I was able to give input and say how I see my daughter's abilities as far as eye contact, her physical movements, and how she communicates."*

One mother, who is a special education teacher, credited her positive experience with the assessment process as the reason that she encouraged her school district to become a TTAP site. That parent is now the Technology Coordinator for the area's special education cooperative, which serves 18 counties in central Illinois and which became a TTAP site.

Two other mothers of children assessed by TTAP have requested information on TTAP Outreach training for teams in their area. Four mothers served as members of a panel for the opening session of the ACTT VI Conference's second day in March 1995, shared their experiences in using technology with their children, and discussed assessment benefits and IEP goals.

Although the Project has ended, families continue to contact TTAP staff. They request information and assistance in acquiring new equipment, updating older machines, selecting appropriate software, and writing IEP goals which include technology.

Results from the TTAP Outreach Child Follow-up on School Technology Use survey indicate that teachers have seen children progress with technology after a TTAP assessment. Teachers have noted children's increased attention span, improved communication skills, and better understanding of how to use the switch or TouchWindow. Since the TTAP assessment provides a guide for teachers and families to assist children through levels of switch use and to eventually scan choices for communication, switch skills are noticeably increased following an assessment. Teachers also report increases in specific skills related to a child's IFSP or IEP, such as visual tracking or identifying objects.

Effects on Sites and Staff

Replication site staff report the TTAP model to be beneficial to their program. Benefits include an increased use of technology by children and families at sites. One site staff member commented, *"[TTAP] has been especially wonderful for children to be able to access the computer who normally would not be able to because of physical/cognitive impairments."* Other sites have found the TTAP model to be helpful in establishing a team process for conducting technology assessments. One person stated, *"We are able to conduct more thorough assessments and appreciate the value of teamwork more."* Another reported that the model *"definitely helped in the dissemination of skills and knowledge, by sharing expertise with each other, staff can often do a lot of the assessments on a routine basis."*

Competencies. Results from TTAP Outreach Technology Assessment Competencies given to site staff immediately following training indicate that at least 70% of training participants (n=40) gained skills in the following areas:

- Listing considerations for planning assessment agenda with appropriate activities and breaks
- Listing other adaptive materials which may be needed during the assessment
- Determining procedures for the logistics of an assessment
- Organizing the assessment room into four areas: assessment, play, display, and observation
- Equipping each area with suitable materials, hardware, and adaptive equipment
- Determining the correct switch for a child according to sensitivity, size, feedback, and durability

- Using observation forms for recording observations made during the assessment or while viewing a videotape of the assessment activities
- Using the TECH ACCESS observation form
- Assessing the child's abilities to use touch tablet input
- Assessing the child's abilities to use keyboard input

Adaptations to the model. Although sites reported benefits in using the TTAP model, many found it necessary to make adaptations to fit the model into their existing assessment services. According to Larry Cuban (1997), such adaptations are not uncommon and should be expected. Fourteen sites (80%) reported modifications made to the TTAP process. Changes were made to the TTAP assessment forms to fit site needs. Some condensed the forms; others eliminated some planning forms which they felt were too time consuming.

IX. Impact

As evidenced by the number of requests for workshops, training and assessments regularly received by TTAP staff, the importance of technology assessments for young children is being realized by an increasing number of families and early childhood personnel. The TTAP model fulfills a need for assessment team training and helps ensure successful technology use by children with disabilities. Recommendations from TTAP assessments have led to increasing inclusion of technology in IFSPs and IEPs.

A summary of requests for TTAP services over the past 3 years is shown in Table 2. Requests for awareness, assessment, materials, training and other services total 597. Table 3, Indicators of Impact, provides a summary of selected activities. Over the 3 Outreach years, 1,241 people attended TTAP presentations at conferences, and over 175 requests for awareness materials were received.

TTAP procedures are presently being used by technology assessment teams in 18 replication sites and two continuation sites. TTAP continuation sites have served 443 children and families, while the replication sites have served 13,498. Each site adapted the model to fit into assessment

Table 2. Requests for TTAP Services
October 1994 - February 1998

	Written	Phone	Internet	Total
Awareness	70	43	62	**175**
Request for Assessment	4	55	0	**59**
Materials/Forms	42	61	13	**116**
TTAP Manuals	58	37	0	**95**
Presentations	13	19	3	**35**
Training	24	34	3	**61**
Other	17	27	12	**56**
Total	**228**	**276**	**93**	**597**

services. Six hundred ninety seven (697) children and families (approximately 5% of total served) were impacted through TTAP replication and continuation sites' assessment work.

The TTAP model provides replication sites with much-needed assessment guidelines for determining the technology needs of their young children. Data collected on assessments, follow-up activities, and recommendations provide evidence of the effectiveness of the TTAP process. A review of the data indicates that sites use TTAP forms, with modifications, consistently before, during, and after the assessment. *The Background Information Form* is used before the assessment and the *Individual Trial Form* is used by sites to record activities during the assessment. *TECH*

Table 3. Project TTAP Indicators of Impact
October 1994 - February 1998

Awareness		
	Number of persons receiving materials via conference attendance and participation	1241
	Number of persons requesting awareness materials or information by phone/letter/e-mail	175
Stimulating High Quality Programs		
	Number of children served at continuation sites	443
	Number of replication sites	18
	Number of professionals trained on model	84
	Number of children served at replication sites	13,498
Product Development Distribution		
	Number of products distributed	103
	Number of requests for TTAP materials/forms/manual	211
	Number edited assessment videotapes produced	3
	Number of viewers	1433
	Number of children served by those receiving Project materials	12,698+
Training		
	Number of requests for training	61
	Number of workshops conducted	54
	Number of persons receiving training	303
	Number of children with disabilities served by persons receiving training	3,636
Other Technical Assistance Consultation		
	Number of requests for assessments	59
	Number of children served with increased high quality services	28
	Number of persons receiving information on assessment techniques, hardware and software recommendations, and sources of funding for equipment	162

ACCESS, TTAP's observation tool, is used by sites to make recommendations on input method, adaptations, and curriculum activities. Site team members report the usefulness of the assessment process. One team member described the TTAP model as "*An excellent guide to planning and conducting technology assessments.*"

TTAP assessments help families realize the potential of technology for their young children. Technology can be the means by which a child with severe disabilities becomes an active

participant of society. Families may discover this for the first time during a TTAP assessment. One mother from the Just Kids continuation site sums up her daughter's active participation in the assessment with the comment, *"She came alive when she pressed the switch. This is something that has helped her come out of her shell."* Through appropriate recommendations and follow-up services, children and families can reap the many benefits technology has to offer.

TTAP Products. Products include a manual, *Technology Team Assessment Process,* available since the first year of Outreach. The manual describes the assessment procedures in three parts, before, during, and after the technology assessment. All of the forms developed by TTAP and a sample set of completed forms for a case study child are contained in the publication. *TECH ACCESS*, the observational tool used during the assessment, is included in the manual and is also available separately. Resource information in the publication is updated regularly. Favorable comments received from users of the manual include *"The structure and organization of the process as outlined in the book is most useful,""The book was extremely useful," "The information and the forms are very helpful."*

TTAP training modules continue to be used during workshops and training sessions as appropriate. The modules were revised and updated as needed. Module content is based on assessment procedures, forms, and assessment factors, including equipment and software selection, environmental design, input method selection, adaptations, and curriculum integration.

Three videotapes are available on TTAP's assessment process. The tapes have been used during training and presentations. One videotape is a compilation of segments from various TTAP assessments illustrating child positioning, equipment placement, and levels of software and peripheral use. The second videotape is a case study of a child assessed by TTAP staff. The third videotape is of the December 1995 APPLES Magazine broadcast, *Developmental Goals Through Technology*. The video presents the TTAP process and shows videotaped segments of assessments.

TTAP products are available from Macomb Projects, 27 Horrabin Hall, Western Illinois University, Macomb, Illinois 61455; 309/298-1634; fax 309/298-2305; www.mprojects.wiu.edu.

Contributions to the field. The TTAP model, together with Outreach replication, training, dissemination, and product development, contribute to greater knowledge and more effective practices in early childhood programs. A sample of the Project's contributions follow.

(1) The experiences of TTAP replication sites, model and topical training, and interest generated result in practical additions and/or revisions of procedures such as condensing forms to fit site needs, adding a screening step to the referral process, and amending forms to individualize them. An increased number of scholarly activities, including the three-year follow-up research study cited earlier (Hutinger, Johanson, & Stoneburner, 1996), were designed to study technology assessment procedures, make the process more effective and reduce the negative effects of existing barriers including inadequate assessment and inappropriate technology applications. One such activity is an externally funded project to develop an assessment software prototype with an accompanying data base of software that meets needs of specific children (Technology Assessment Software Package). Another example is the ECCTS (Early Education Comprehensive Technology System) study, a qualitative research design carried out in collaboration with Just Kids, a large preschool program in New York on Long Island. The three-year study is designed to examine the effects of a comprehensive, tested early childhood technlogy system, which includes TTAP (Hutinger & Rippey, 1996; 1997).

(2) TTAP sites provide data on children, families, and staff so that the outcomes of technology procedures and recommendations can continue to be studied, improved, and compared across sites and disabling conditions. TTAP replication in conjunction with ECCTS demonstrated the need to adapt the process and include items related to achievement testing, in order to meet state and local policies for funding.

(3) Program personnel and families have access to tested, successful technology assessment procedures which reflect available current and newly marketed technology applications. Between October 1994 and February 1998, 597 people took advantage of the availability of TTAP materials and services (see Table 2).

(4) TTAP's promising practices have become more widely discussed and implemented.

(5) Networking and coordination in activities such as ECCTS has multiplied the positive effects of TTAP services and result in advancing knowledge more rapidly through sharing information and procedures. (TTAP materials have been used in special education technology and early childhood assessment coursework at universities and as part of training content provided by state assistive technology projects.

(6) TTAP training promotes strategies to access the regular curriculum through assistive technology and adding technology-related goals to IFSPs and/or IEPs.

X. Future Activities

Although TTAP's outreach funding ended in February, 1998, requests for TTAP services continue to be received regularly. Training for assessment teams in Nebraska is scheduled for July 1998. Other recent requests were received from Madison County Special Education Cooperative in Edwardsville, Illinois, and Lincoln Way Area Special Education in New Lenox, Illinois, both large agencies serving many school districts. Training will be done during the coming school year at the individual site's expense.

Requests for products, including *Technology Team Assessment Process*, *TECH ACCESS*, and videotapes are received on an ongoing basis, and will continue to be distributed through Macomb Projects. Training materials and TTAP videotapes are used during workshops and presentations by TTAP staff. Technology assessment is still a requested topic by conference organizers and training coordinators from school districts across the country. TTAP staff will continue to make information on technology assessment available on the Macomb Projects' web site, www.mprojects.wiu.edu.

TTAP staff will continue to conduct technology assessments for individual children as requested by families and school staff. Three assessments have been conducted locally since the Project ended in February 1998. An assessment for a young child served by our local school district and one of our sites, the West Central Illinois Special Education Cooperative, is scheduled for September 1998. TTAP staff provided training to this site through local assessments. After this session the site plans to conduct assessments independently.

XI. Assurance Statement

A full copy of this report has been sent to the ERIC Clearinghouse on Handicapped and Gifted Children. Copies of the title page and abstract were sent to NEC*TAS, the National Clearinghouse for Professionals in Special Education, the National Information Center for Children and Youth with Disabilities, the Technical Assistance for Parent Programs Project, the National Diffusion Network, the Child and Adolescent Service System Program, the Northeast Regional Resource Center, the MidSouth Regional Resource Center, the South Atlantic Regional Resource Center, the Great Lakes Area Regional Resource Center, the Mountain Plains Regional Resource Center, the Western Regional Resource Center, and the Federal Regional Resource Center.

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